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(81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

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Published:

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WO 2004/004934 A1

(54) Title: ULTRASONIC CLEANING AND WASHING APPARATUS FOR FRUITS AND VEGETABLES AND A METHOD FOR THE USE THEREOF

(57) Abstract: The invention provides a method and an apparatus for washing and cleaning fruits and vegetables. The apparatus has a degassing means (14); a washing tank (26) which accommodates at least one item for cleaning; an ultrasonic means (28); at least one water pumping means (32); a water jetting means (62) for directing a plurality of jets of water towards the at least one cleaning item to halt circulation and motion of water in the washing tank (26) and concurrently to bring the rotation and motion of the at least one cleaning item to halt within the shortest period of time, a holding means (52, 70) to facilitate passage of ultrasonic energy through the water to optimally penetrate the at least one cleaning item immersed therein; and a control means (16) for programming and executing relevant process parameters in the operation of the apparatus.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/IL03/00561

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : B 08 B 3/10
 US CL : 134/56R

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
 U.S. : 134/56R, 134/137, 134/148, 134/153, 134/157, 134/184, 134/187

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|--|-----------------------|
| Y | US 511,881 A (LIN et al.) 19 MAY 1992 (19.05.1992), see cols. 1-10. | 1-14 |
| A | US 5,127,962 A (INOUE et al.) 07 JULY 1992 (07.07.1992). | 1-14 |
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| Y | US 5,810,037 A (SASAKI et al.) 22 SEPTEMBER 1998, see cols. 1-12. | 1-14 |
| A | US 6,016,821 A (PUSKA) 27 JANUARY 2000 (27.01.2000). | 1-14 |
| Y | US 6,290,777 B1 (IMAOKA et al.) 18 SEPTEMBER 2001 (18.09.2001), see cols 1-32. | 1-14 |



Further documents are listed in the continuation of Box C.



See patent family annex.

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| * Special categories of cited documents: | "T" | later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention |
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| "P" document published prior to the international filing date but later than the priority date claimed | | |

Date of the actual completion of the international search

20 October 2003 (20.10.2003)

Date of mailing of the international search report

12 NOV 2003

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INTERNATIONAL SEARCH REPORT

C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|--|-----------------------|
| A | US 6,328,828 B1 (RUSCZYK) 11 DECEMBER 201 (11.12.201). | 1-14 |
| A | US 6,481,4449 B1 (MANCHESTER et al.) 19 NOVEMBER 2002 (19.11.2002). | 1-14 |

PCT/IL03/00561 30 DECEMBER 2004
PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

| | | |
|--|---|---|
| Applicant's or agent's file reference 1730 | FOR FURTHER ACTION | see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below. |
| International application No. PCT/IL03/00561 | International filing date (day/month/year) 07 July 2003 (07.07.2003) | (Earliest) Priority Date (day/month/year) 08 July 2002 (08.07.2002) |
| Applicant PALBAM METAL WORKS KIBURTZ HAROD IHUD | | |

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 4 sheets.



It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the Report

- a. With regard to the language, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international search was carried out on the basis of the sequence listing:

contained in the international application in written form.

filed together with the international application in computer readable form.

furnished subsequently to this Authority in written form.

furnished subsequently to this Authority in computer readable form.

the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

2. Certain claims were found unsearchable (See Box I).

3. Unity of invention is lacking (See Box II).

4. With regard to the title,

the text is approved as submitted by the applicant.

the text has been established by this Authority to read as follows:

5. With regard to the abstract,

the text is approved as submitted by the applicant.

the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the drawings to be published with the abstract is Figure No. 1

as suggested by the applicant.

because the applicant failed to suggest a figure.

because this figure better characterizes the invention.

None of the figures

INTERNATIONAL SEARCH REPORT

International application No.

PCT/IL03/00561

Box III TEXT OF THE ABSTRACT (Continuation of Item 5 of the first sheet)**NEW ABSTRACT**

The invention provides a method an apparatus for washing and cleaning fruits and vegetables. The apparatus has a degassing means (14); a washing tank (26) which accommodates at least one item for cleaning; an ultrasonic means (28); at least one water pumping means (32); a water jetting means (62) for directing a plurality of jets towards the at least one cleaning item to halt circulation and motion of water in the washing tank (26) and concurrently to bring the rotation and motion of the at least one cleaning item to halt within the shortest period of time, a holding means (52, 70) to facilitate passage of ultrasonic energy through the water to optimally penetrate the at least one cleaning item immersed therein; and a control means (16) for programming and executing relevant process parameters in the operation of the apparatus.

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| "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) | "&" | document member of the same patent family |
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Name and mailing address of the ISA/US

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Form PCT/ISA/210 (second sheet) (July 1998)

PCT/IL03/00561

INTERNATIONAL SEARCH REPORT**C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT**

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